A BOOK FOR EVERY

HORSE OWNER.

A BOOK FOR EVERY HORSE-OWNER.

THE HORSE'S FOOT,

AND

HOW TO SHOE IT.

GIVING THE MOST APPROVED

METHODS OF HORSE-SHOEING

TOGETHER WITH THE

ANATOMY OF THE HORSE'S FOOT AND ITS DISEASES.

BY J. R. COLE.

With Forty-two Illustrations.

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INDEX.

THE HORSE'S FOOT, AND HOW TO SHOE IT.

CHAPTER I.

General Remarks.

In order to obtain the greatest amount of usefulness from horses, through endurance, speed, and physical strength, it behooves us to look closely to all things pertaining to their health, for without this they become useless ; and, above and beyond all of this, it is nothing more than humane to look after their welfare. If health is more easily preserved than restored, it is but wise and reasonable that we should always seek in time for the "ounce of prevention."

How to prevent defects and diseases in horses, is really better than knowing the remedial agent with which they can be cured ; and, moreover, it very often happens that the drug administered to perfect a cure in the one case, becomes but a poison to insinuate another malady, worse even than the first.

We cannot expect to see the greatest speed and endurance in a horse until he has attained full possession of all his faculties; but these are neither developed in a single day nor *ever* perfected without special care and training during his tender years. Indeed, the man who expects his horse to work for him like a steam engine, can well afford, for humane as well as for com-

mercial reasons, to look well at all times to his general health.

The foot is the foundation of the horse, and, as may be said, the foundation of his health; for "no foot, no horse," is such a veritable truism, that the most casual observer would readily conclude without any explanation, that if the foot becomes affected or diseased, its usefulness would become impaired and the animal rendered unfit to perform the services required of him by Nature. In fact, a horse without sound feet, is no horse at all.

The foot of the horse is subject to so many diseases:—Founder, Laminitis, Thrush, Corns, Canker, Contraction, Ossification of the Cartilages, Navicular disease, etc., etc.; that it needs the greatest care and attention to preserve it healthy and sound—I say healthy and sound, because in a state of Nature it *is* thus, and if afterwards it is found diseased, the cause, in the majority of cases, can be attributed to the smith's shoe and pruning knife, or to some fault of the owner.

The facts here noted may be questioned in regard to diseases inherited, but still I plead that the care of the foot in the sire or dam may save that of the colt.

It is a known fact that even acquired qualities, good or bad, whether from sire or dam,—whether from the immediate parents, or from their progenitors,—are easily transmitted to the offspring; and as with good or bad points, so with diseases, even of the feet: the navicular disease itself not escaping, but having been inherited, proof of which could be given, if necessary.

If what we deem facts seems far-fetched, we ask you to contrast the endurance, speed, strength, and general health of the wild herds that flock in thousands

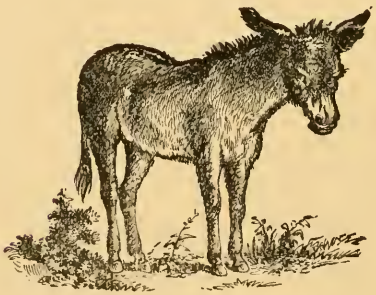
on the plains, in the freshness of their airy freedom—having Nature to care for and protect them—to the bedizzined looks, and shaky ankles and tremulous gait of our domesticated (?) brutes.

The truth is, the sore-toed, ring-boned, and spavined horse of to-day is but too often the result of mismanagement. Contracted and thrush-eaten feet are caused by rickety, rotten, and stinking stables—and a score of other diseases, come from eating sour grain and musty hay—with nothing but poisonous air and water to breathe and drink. Of these we simply speak, and leave the rest to the doctors of veterinary science. We also leave them to speak of the curative properties of their pharmacopea as found in mercury, digitalis, ginger, camphor, salt-petre, iodide of potassium, oil of juniper, etc., etc., all of which, probably, have their place—but we shall try here only our "prevention" for the many diseases to which the foot is subject, believing in the remark before made, that it is easier to *preserve* the health of the horse's foot than it is to *restore* it.

Again, we would labor in behalf of the horse of all work; for the low bred; for the drudge of servants.

The racers, pacers, and trotters of noble extraction already receive every care and attention that skill and understanding can bestow; their owners know too well the cost-price of a good foot to think of neglecting it. But not so, sometimes, with the horse of all work. The "old plug," receives different treatment altogether. He is cursed into the harness in the morning and kicked out at night; is made to stand at post-hay oftentimes when he should have been turned loose in a ten-acre corn field; he gets no pet names and receives no gentle (?) taps. No Arab's foolishness is squan-

dered on him. He is "broke" to work—and generally broke with a vengeance. Club discipline brings on "old days" very fast, and he is soon to be forgotten for evermore. I think the mule was created especially for such horse-masters, as they (the masters) belong somewhat to the pennyroyal stock themselves. They can play the statesman in politics, but are not wise enough to shelter a good horse from a cold, drizzling rain; to water him when thirsty, or to feed when he is hungry.



CHAPTER II.

The Feet of Colts.

If proper attention be given to the feet of horses in their colt-hood days, many of the ills that horse flesh is heir to, can be avoided; for it must be remembered that the majority of diseases in horses originate in the feet.

One cause generally overlooked is the unnatural growth of the horn on one side of the ground surface of the foot. This surplus growth raises one side higher than the other, and the foot becomes twisted out of its natural shape; this also affects ankle and knee joints causing a partial displacement of the bones within. It may be seen by reference to Fig. 1 the principle upon which this acts:

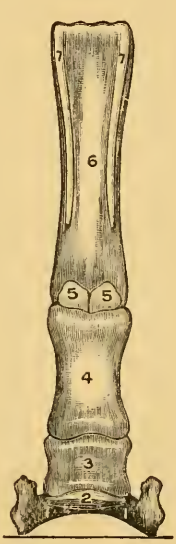


Fig. 1.

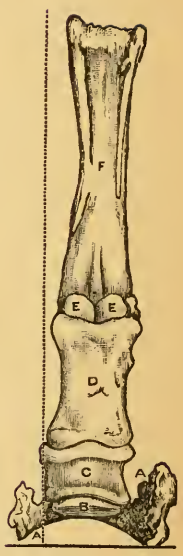


Fig. 2.

Cut of Bones taken from Nature to show the effects of tilting the foot to one side.

A. 1.—Coffin Bone, or Os-Pedis.
B. 2.—Nut Bone or Os-Naviculare.
C. 3.—Small Pastern or Os-Coronæ.
D. 4.—Large Pastern or Os-Suffraginis.
E. 5.—Sessamoid Bones.
F. 6.—Shank or Cannon.
G. 7.—Small Metacarpals.

Thus, in the ordinary-sized foot and leg, if one side of the foot is raised but *one-fourth of an inch*, the general displacement of the bones in the foot and knee

joint is so great as to throw them completely on to one side of the heads of their journals. A shoe raised at the outer heel only, produces the same results. This throwing of the weight to one side only, twists the foot of the horse the same as an old run-down boot does for the foot of man; but the one can pull off his boot at night and ease his aching foot, by morning; the other can not, his shoe is on for a month, and his boot-jack is down at the forge.

If a calking be put on the outer heel to prevent the horse from slipping, either the horn of that heel should be lowered to a corresponding degree, or the outer heel of the shoe should be raised to the same level, by a gradual thickening.

By further reference to Fig. 2 (see A) we see on that side where the weight is thrown, that there is a fungus growth of ossified cartilage. This bony growth is partly within the hoof and partly above the coronary band, and is one of the results of this lateral pressure; likewise the splint bone at F is both enlarged and lengthened, and the head of the journal on that side is slightly raised. We can now see the evil results, all the way from the foot to the knee; the ossification of cartilage has killed the nerve of the foot and made the shell hard, and brittle, and easy to crack; has produced splint, and has stiffened the foot to such a limited use of the joints, as to make motion almost impossible.

By reference to Fig. 3 we can form a tolerably correct notion of what this destruction of cartilage, or the changing of the same into bony growth is. A, is the coffin-bone that fits closely into the hoof. B, shows the wings of the coffin-bone, and their cartilages ossified together.

These cartilages, before mentioned, occupy a considerable portion of the external side and back part of the foot, and are so placed that, if an undue pressure or strain is brought to bear upon them, they will become inflamed, and that will lead to substitution of *bone* as fast as the CARTILAGE becomes absorbed. Most heavy draught horses have this change of structure before they arrive at old age. In a healthy state of the feet these cartilages will readily yield to the pressure of the fingers. They can be felt on either side of the foot on the coronet just above the quarters, but by degrees the resistance becomes greater, and when bone is formed, they will yield no more.

Fig. 3.

Ossified Cartilage. Cut taken from Nature.
A—Coffin Bone.
B—Cartilages and wings of the Coffin Bone Ossified.

In slight changes of structure the veterinary surgeon may, by firing or blistering, arrest the disease; but when the whole part is changed to bone, it will be exceedingly difficult to cure. In such a case a shoe rolled or beveled at the toe, will ease the foot over and take the strain off the joints. Such a shoe will also induce some action in the movement of the cartilages and ankle joints which is necessary to a free flow of the blood; and, perchance, Nature being assisted, the health of the foot, in part, at least, may be restored; the nerve again quickened into life and the hoof be made to resume its tough and elastic condition, and in appearance regain its former shining, resolvent look.

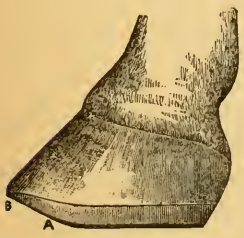


Fig. 4.

This bony growth on the metacarpals and joints, is but the kind assistance Nature renders in some cases to avert calamities. For the weight of the horse superimposed upon one side of the heads of the journals in their joints will induce friction, and finally fever and inflammation of the joints. The cannon bone and splint, now on that side, need assistance—and for this purpose they become united or anchylosed by the exostosis of the ligamentous structure between—hence uniossification.

Another cause of lameness, especially in the feet of colts, comes from improper stabling. No one should be persuaded to allow a colt to be stabled in a stall, the floor of which is made of wood. The feet of colts are fearfully subject to any extraneous influence, owing to their youth and tender years. In this immature state the feet will contract or expand very rapidly. If allowed to run at grass, the earth, with an occasional rain, or a morning dew, will keep the hoof elastic and tough and allow it to expand to meet its wants; but if kept on a wooden floor (a worse conductor than the earth), it will become hard and brittle and liable to contract; or if it is kept constantly wet by "stopping," there is danger of decomposing the soft covering of the frog, and thus waste it away.

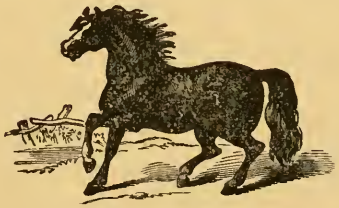
The best way to guard against feet becoming contracted or thrush-eaten, and at the same time prevent dampness, is to make a stable with mother earth as a flooring. Excavate say two feet deep and fill up half full with stones; then cobble stones three or four inches, then as much earth, and lastly, as much sand or bank gravel, and the floor is made. It is cheap—can't rot out, and at the same time the liquids will easily drain

through and leave no poisonous or ammoniacal gases behind. Feet thus stabled will need no dirty cow-dung stopping.

There is also a pernicious practice of huddling a great many horses together in one stable (especially true in large cities), which necessitates their being tied or chained in some narrow stall. This very much circumscribes their movements and impairs their spirits, if not their general health, by being thus doubly imprisoned. A Bengal tiger is given more room to move around in, and why should such a docile animal as the horse be thus confined?

Nature grants health only on condition that exercise be given, and, in fact, all animated matter proves by its incessant motion, that life only ceases when all elements are at rest—"We live by dying, and die by living."

If you can not accommodate your stable to something different from a prison cell, then do not permit your horse to stay in doors too long without exercise. Take him out frequently and let him have some fresh air, a little run, and a little play. It will do him good, as it will make him happy, and that will help to keep him healthy.



CHAPTER IV.

On Keeping the Ground Surface of the Foot Level.

Our plan is here to illustrate by cuts and otherwise the injurious effects of not keeping the foot always pared level and straight. Mistakes of this kind are but too often the result of ignorance on the part of the farrier, or in his not having a proper notion of the science in which he professes skill and understanding. We have no hesitancy in calling it a science, and indeed, the man who shoes horses for the *various diseases of the feet*, has an implied profession of knowledge, in the outset, of the anatomy of the horse's foot, and an acquaintance with the best methods on farriery for paring the hoof, and fitting it with a suitable shoe. Such a profession is by no means an indifferent one; it should be encouraged in some way by suitable legislation, until we could get more men at the forge who could shoe with brains as well as iron. To know how "to blow and to strike," is no proof against the diseases of the horse's foot.

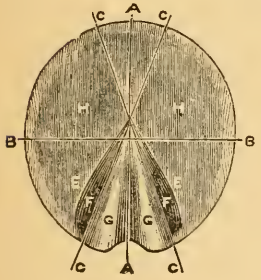


Fig. 5.
Cut of Colt's Foot.
A B—Lines bisecting the foot.
C C—Lines enclosing the Frog and the Toe.
H H—The Sole.
E E—The Bars.
G G—The Frog.
F F—The Commisseurs.

Mr. William Russell, a horse-shoer in this city, (we give cuts of horse shoes used by him in this book)

is one of the few farriers, East or West, that fully understands this science. His success at the forge has given him almost innumerable acquaintances throughout the whole country, and indeed, his services to the profession will be enduring. He deserves the heart-felt thanks of every horse owner for founding this science upon strictly physiological principles.

Mr. R.'s success lies principally in the simple fact of keeping the ground surface of the foot *perfectly level* and straight—and in order to do this accurately, he takes measurements similar to those shown by the lines on the sole surface of the foot in the colt—also others—on the outside of the hoof, from the coronet to the ground surface. Lines in this way, showing measurements on both sides of the toe, quarters, and heel, enable him to properly level the sole surface, while those measurements taken on the sole surface show how to properly balance the foot all around.

The cut (Fig. 5) represents the sole of a colt's foot, and is perfect and symmetrical in all of its parts. The lines show proportions of that perfect form and contour that Nature gives. The sole, the frog, the bars, the arch-like construction of the brace within formed by the cleft of the outer frog, being the work of Nature, are perfect. No construction could be devised by man, upon sound mathematical principles, that could give inch for inch, out of any material whatever, anything like the strength, the stability, and the protection against injury that this arrangement does.

It is simply perfect, which means, in this connection, that man should let it alone; and if, by accident or otherwise, it becomes injured, if anything then be done, it should be only to replace it in its natural normal state.

Nature has curative processes within its own reach better than any prepared by man, and needs only assistance from him to perfect her own cures.

To show more fully the evil effects of meddling with Nature, I will represent some of man's own handwork for the sake of contrast. This is a cut that fully represents the ignorance, or the assumption of the smith in believing that Nature could be excelled, at least, in the final finishing or "touching up processes."

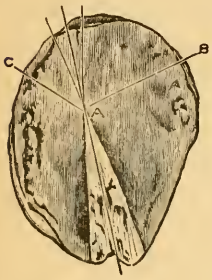


Fig. 6.
A—Point of Frog.
A B and A C, lines showing improportions.
(The nail holes in the sole indicated by the dark spots).

This cut represents the sole of an old servant, drawn from Nature, that probably did the easy, (?) slow work of a draught horse, rather than that of the hackney, or hunter. From appearances, judging the way his sole had been pared off, and punched out, and, from the twisted condition of his his foot, in all probability, for want of comeliness, alone, in his pedal extremities, this horse had to relinquish his right to the title of "The Pet" a long while before he was released from his every day drudgery in his master's employ: — but now alas! he's gone, and his sole alone remains.

We give a view of this same sole, (Fig. 7) and draw attention particularly to the long toe, the flat, open heel, and the diseased laminæ. By cutting out the sole, opening up the heel, and lowering the foot on one side, more than on the other, the weight of the horse brought sufficient lateral pressure to disengage the sensitive

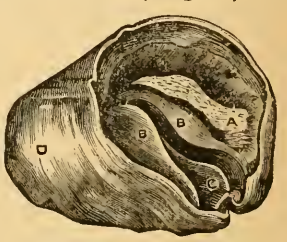


Fig. 7.—Of the Foot.
A—Diseased Laminæ. B—Bars.
C—Cleft of the outer Frog.
D—The Long Toe.

leaves connecting the one side of the coffin-bone to the inside of the hoof, and in that place stopped the growth of the foot—but the other side remaining healthy and active, continued to grow—and this is the cause of the twisted, crooked condition of the foot.

In such cases, the smith could do much to assist Nature in getting the foot back into its original normal state, by first getting it as nearly level as possible, rasping off all unnatural growth so as to get the foot, if possible, more evenly balanced on all sides, and shortening up the toe. This, probably, would evenly distribute the pressure over the foot, and cause new horn and laminæ to spring forth from the diseased sides.

Raised Coronet.—This is one of the many results of improperly leveling the foot on the ground surface, as reference to Fig. 8 shows. The evils resulting from this defect of the horn not having grown down sufficiently on one side, may be caused also by the coronary ligament becoming defective; but when the foot is tilted, and the pressure is brought to bear upon the one side, the ligament, if diseased, may be, and undoubtedly is, by this undue weight and strain, rendered so imperfect as not to be able to secrete the horn. The cut, which was taken from Nature, speaks for itself, and shows the twisted condition of the foot, internally as well as on the outside.

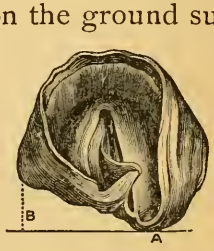


Fig. 8.
Raised Coronet.
A B—Showing the correct ground surface of the foot.

Fig. 9.
Shoe for Raised Coronet, showing where to nail.

The shoe for raised coronet (Fig. 9) shows that the nailing should be on the side

opposite the raised coronet. This will leave a space between the shoe and foot, and allow the weight of the horse to gradually spring his foot to the shoe on that side and correct its shape. The hoof should be weakened by being rasped down on the side of raised coronet for that purpose.

CHAPTER V.

The Anatomy of the Foot.

The Pasterns and their Joints.—On account of the horse's foot being subject to so much mismanagement, and so many diseases, it becomes necessary to understand the various parts which enter into and compose its structure, before treatment can be intelligently given. These cuts will aid the reader materially in locating the organ, and in getting an idea of its functional office.

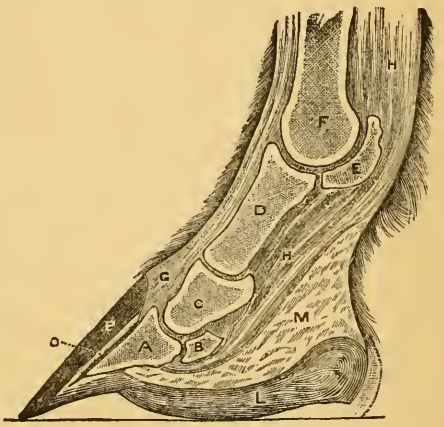


Fig. 10.

Cut of the Pasterns, Bones, Ligaments, etc.

A—Coffin-bone, or bone of the foot.
B—Navicular, or Shuttle bone.
C—Lower or smaller Pastern Bone.
D—Upper or larger Pastern Bone.
E—Sessamoid Bone.
F—Shank, or Common Bone.
H—Tendon of the Perforating Flexor inserted into the Coffin Bone after having passed over the Navicular Bone.
G—Extensor Tendon inserted into both the Pasterns and the Coffin Bone.
L—The Sole.
M—The Sensible Frog.
P—The front part of the Hoof.
O—The Sensible Laminæ connecting Coffin Bone with inside of Coffin Box.

It is not our purpose in these pages to go above the knee, and even of that complicated joint of seven bones, and cartilages, to say but little—suffice it to say, these bones are so arranged, each with a coating of cartilage, as to completely destroy concussions, and render the same harmless.

The part of the knee and fetlock consists of three bones: a large one, called the shank, or cannon bone; it is rounded in front and flattened behind; it is straight, and in some parts it is covered only with the skin. There are slight depressions at the upper head, to receive the lower row of bones of the knee; but at the lower head there are three elevations: one at each side, and one principal in the center. Between these elevations on the side and in the center, are two slight grooves, which correspond with the slight prominences in the upper head of the large pastern.

This hinge-like joint between the shank and pastern admits of no lateral motion whatever. There are two smaller bones not seen in the cut, but placed behind the shank bone, and reach from one-half to two-thirds the way down that bone. We have spoken of these bones before (see Fig. 1). The heads of these bones (splint) are enlarged, and receive part of the weight conveyed by the lower row of bones of the knee.

The upper pastern bone (Fig. 10, D) forms a hinge joint with the shank, and in its lower head has two rounded protuberances, which are received into the depressions on the upper head of the lower pastern. The lower pastern is a short, thick bone, with larger head downward, resembling the lower head of the upper pastern, with its two prominences, by which it articulates with the coffin bone. The lower pastern, with the coffin bone, forms the coffin joint. The articulation of the pasterns with each other gives that of the pastern-joint, while that of the shank with upper pastern gives the fetlock-joint.

The perforating tendon (flexor tendon) passes down between the splint bones (smaller metacarpals) through

a large mucous bag, and over the sessamoids, and is fastened into the lower pastern. A continuation of this tendon fastens itself into the under side of the coffin bone. The extensor tendon, as seen in the cut, is used in carrying the foot forward, the flexor tendon in bending the foot. In speaking of the back sinews, Youatt says in substance:

That "These tendons are inclosed in a sheath of dense, cellular substance; and when the horse has been overworked, or put to violent exertion, the tendon is made to press upon the delicate membrane lining the sheath, and inflammation is produced; a different fluid is thrown out, which coagulates; adhesions are formed between the sheath and the tendons; and the motion of the limb is more painful. At other times, from violent or long-continued exertion, some of the fibres which tie the tendons down are ruptured. A slight injury of this kind is called a strain of the *back sinews* or tendons, and when more serious, the horse is said to have *broken down*." "But," he adds, "it should be remembered that the tendon can never be sprained, because it is inelastic, and incapable of extension; and the tendon and its sheath are scarcely ever ruptured, even in what is called 'breaking down.' The injury is confined to the inflammation of the sheath, or a rupture of a few of the attaching fibres."

The pasterns are united to the shank in an oblique direction—this necessitates part of the weight to be communicated to the little sessamoids to deaden a portion of the jar or concussion. These little bones have no other bone under them, and are fastened by a ligament (suspensory) that yields, so that when weight is brought, as seen in the downward movement of the foot, they descend or partly turn round with the pres-

sure, and return again to their usual place when the foot is raised.

The length and obliquity of the pasterns vary, differing in the different breeds of horses. In proportion to the length and slanting direction of the pastern, so is the springiness of action. If the pastern is long, it must be oblique, or the fetlock would touch the ground in rapid motion. If the pastern is long and slanting, the greater will be the weight thrown on to the sessamoid bones, and the less on the pastern; and in that proportion, jar or concussion will be prevented by the obliquity of the bones.

A slanting pastern is an excellence in the race horse; but he must have a good fetlock-joint, as the liability of that joint, and of the back sinews, to sprain, is greater in the oblique pastern. A less degree of obliquity is required in the hunter, and still less is necessary in the hackney; but the dray horse should have short, upright pasterns. This enables him to dig his toe into the ground, but it would not do, contesting in the race; neither would the racer get much toe-hold on a heavy pull with his long pastern. Thus a pastern, long or short, has its advantages, and also its corresponding disadvantages—for the very circumstance that enables the dray horse to throw himself into the collar, throws the race-horse down.

This makes the short, upright pastern unsafe in the riding horse, even in ordinary work, as he is inclined to knuckle, and the jars and jolts to which he is exposed by every step he takes, will shortly induce disease in the feet and bones of the leg; but if the pasterns slope at too great an angle, as those of some animals do, the weight of the horse falls so far back on the foot, that

the bones do not help uphold the body, and the whole weight is thrown upon those tendons that run over the back part of the ankle-joints. This will speedily lead to a *break-down*.

Touching the shape of the foot, the hoof should be longer on the ground surface than it is broad, and its breadth greatest directly across the center.

The outer surface of the foot should be smooth and of fine texture, free from rings or protuberances. The proper angle of slant is about fifty degrees; if less than this, and the hoof is very deep at the heels, it is predisposed to contraction. The spryest and swiftest footed animals of the world have small, upright, horny hoofs. The Chamois, red-deer, antelope, and wild horse, all have this formation of the foot.

The fore legs, as a whole, when examined from the front, should have the same space between, from the breast to the ground. When viewed from the side, they should be as nearly as possible perpendicular, the leg dropping straight from its junction with the shoulder to the ground; and the point of the toe should come as near as possible to a straight line under the point of the shoulder. Such a horse will not be a speedy cutter, but will go forward in a handsome, straightforward manner.

CHAPTER VI.

THE PERFECT FOOT.

The foot is composed of the coffin box, and of the contents within that horny structure. The crust or wall is the outside part, and reaches from the termination of the hairs to the ground, the front part of which is called the toe; the posterior part, the heel; and the portions midway between the toe and heel, are called the quarters. A sound hoof, when placed upon the ground, ascends obliquely backward at an angle of about fifty degrees; but when it is more oblique than this, the crust is said to have fallen in; it also indicates an undue flatness of sole—but if the hoof is less oblique than this, the reverse is true, and it indicates a convex sole.

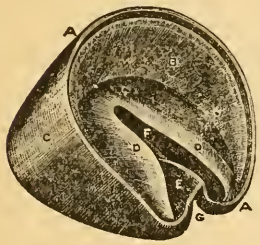


Fig. 11.
The Perfect Hoof.

A A—Coronary substance.
B—The little horny plates lining the crust.
C—Outer surface of crust.
D D—The Bars.
E—That which *externally* is the the cleft of the frog.
G—The cleft of the frog.

If the angle of obliquity is more upright than what we have mentioned, it shows a contracted foot (see Figs. 13, 15, and 16) or a sole too concave. If the crust at the heel is high and deep, and the direction from the coronet to the ground surface be nearly perpendicular at the toe, we may know that the foot is liable to contraction and thrush; and if the pastern is very slanting, and the heels are very low, the foot is liable to

be weak and subject to navicular disease. Thus, many things may be learned about the hoof, by simply looking at it as it rests on the ground.

We give in the annexed cut a hoof, answering to some of the above descriptions. In it may be seen the high heel, short toe, and the falling in of the crust in front. In the perfect foot, the crust is about one half an inch thick at the toe; but it becomes gradually thinner towards the quarters and heels, it not being at that part, more than a quarter of an inch in thickness.

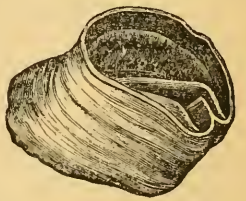


Fig. 12.

The inner quarter is not as thick as the outer, because more weight is thrown on it than upon the outer quarter. It is more under the horse—and especially under the splint bone, on which so much of the weight of the horse rests; but, while it is thinner, it is able to expand more, and avoid injury by concussion. If the shoe is nailed solidly to the inner quarter, so as to prevent expansion of the horn, at that place, it must suffer—corns are often found there; sand-crack begins there; and it is there, that the hoof begins to contract first.

On account of the thinness of the inner quarter, the horn, at this place, wears away faster than it does at the outer; but the smith seems to forget this, and frequently takes off with his knife an equal portion all round; it seldom becomes necessary to remove anything from the inner heel.

The coronary band is the superior border seen at A, in Fig. 11. It resembles, on its external surface, the crust below, but internally, it is smoothly excavated.

It is found intervened between the skin of the leg and the hoof. It has a secretory surface on the edge towards the hoof, and is abundantly supplied with arteries and blood vessels, from which this ligament, together with the laminæ, secretes the hoof.

The secretion is formed in little cells, which are arranged in layers, corresponding with the secretory surface. This accounts for the growth of the crust being downward, and the reason why the nail-holes grow out instead of growing up. The constant growth of the horn is also a provision against the wear and tear of the hoof of an unshod horse, and also makes it necessary for those feet that are shod to have shoes removed every three or four weeks, at farthest, and the horn that has been newly grown (and which would have been worn away by contact with the ground) removed with the knife.

The several parts of the hoof of which we will speak, are, 1st, the Crust or Wall, (of which we have spoken); 2d, the Sole; 3d, the Frog; 4th, the Bars; 5th, the Sensible Laminæ; 6th, the Coffin Bone; 7th, the Navicular Bone.

The coffin-box of the hoof consists of but three distinct parts: the wall or crust, the sole, and the frog.

The sole is the slightly concaved surface at the bottom of the hoof, the thickness of which is about one-sixth of an inch—but it varies in different horses. It is fixed to the inner edge of the crust, and to the outer edge of the bars. It is secreted in plates from the internal surfaces of the hoof; and in this differs from the wall, as it is, in the form of bristly fibres or hairs, agglutinated together. The sole is also fibrous, but is deposited in layers, and is easily separated into scales;

those in the crust or wall lie in straight lines, descending from the coronet to the ground.

The fibres of the horny frog are finer and in not such a quantity as in the sole or wall. The sole is, as we have said, about one-sixth of an inch in thickness; but it is thicker at the toe and along the crust where it unites with the outer wall—for the weight of the coffin-bone is thrown on this part.

The reason that it is hollow or concave, is plain: as the descent of the weight requires a gradual descent or yielding of the sole, so as to lessen the shock, which would be injurious, if not, by this arrangement, deadened or destroyed. A flat sole already presses upon the ground. Of flat feet we will again speak—here we will simply remark, that no shoe should be put on that will destroy this descent of the sole: for if a shoe presses upon the sole, the part that touches the shoe, in its descent, will be bruised, and cause inflammation.

The bars are but continuations of the crust reflected by an acute angle at the heel, and brought together at the toe of the frog. These bars form an arch on either side between the frog and the quarters, to limit the proper extent and expansion of the foot. It is done by their widening, and shortening at each up and down movement of the foot, to admit of the expansion of the quarters. Although the outer crust is thickest at the toe, yet, by the admirable arrangement of these bars, the heel is the strongest part of the foot, and will admit of the shoe being nailed solidly here, instead of at the toe, as is usually done at the present time. The toe is for the horse to spring from, and the heel to land on; but if, in every case, it is nailed solidly to the toe, it will spring off of the heel, and produce lameness. The cuts

of shoes given show where to nail in each case. We can also see the use of these bars, in keeping the outer wall from wiring in, or contracting. They are also useful in affording a protection to the frog, for if deprived of this guard, it will become elevated and thrushy.

The frog is a triangular substance that fills up the space between the bars. Above the horny frog is an elastic substance called the sensible frog. The longitudinal fissure reaching half way down is called the cleft; inwardly it forms a brace, which adds strength to the heel.

The uses of the frog are many; we will simply enumerate a few. It must have occasional pressure, or contact on the ground, to keep it, and all surrounding parts, in a healthy condition. It is a covering and a defense to the sensitive frog; it is used, also, in the expansion of the foot, when part of the weight of the horse is thrown upon it. It is composed of a substance, peculiarly flexible and elastic, so as to yield and return again, to a natural state, when weight is thrown on and taken off. When the foot touches the ground, it seldom does so flush, but in a direction forward, as well as downward; and the frog, in a manner, ploughs into the ground, and gives safety to the tread of the animal.

By a dangerous practice among some smiths, the frog is cut off too much; and this lifts it above the ground, and thus destroys its principal use. It should just come within the level of the shoe, so that, by an occasional contact with the ground, it may obey a law of Nature and discharge its natural function. The frog, as well as the bars, should be left intact. It is a practice with too many smiths to tear down the bars,

and cut away the frog: nothing is more dangerous to the health and the strength of the foot than this.

The coffin bone is the proper bone of the foot, fitting in and filling the fore part of the coffin-box. It is filled with little holes, and is very light and spongy. Through these little holes the blood vessels pass and carry on the circulation, and the various secretions for the foot. This is a beautiful provision of Nature, considering the manner in which important surfaces, around and below it, are to be nourished with blood; and yet so arranged that no inconvenience can arise from occasional pressure.

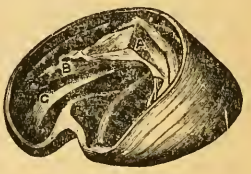


Fig. 13.
Hoof, with Coffin Bone Inserted.
(For Coffin Bone separate, see Fig. 3).
A—Coffin Bone.
B—Wing of Coffin Bone.

The sensible laminæ connect this bone to the little horny leaves or fibres on the inside of the coffin box, we have before mentioned. Its upper surface is concave for the lower head of the pastern, and its under surface is hollowed out for the convexity of the internal part of the sole. On the surface of this bone are fleshy cartilaginous leaves, called sensible laminæ, six hundred and ninety in number. These little leaves have feeling, and are received within horny plates (see B, Fig. 11) on the inside of the coffin-box. These horny plates extend all around the inside of the crust, and reach from the coronet to the sole. They are secreted from, and produced by, the fleshy leaves; and their union with each other being so strong, no violence can easily separate them. They support the weight of the horse when at rest. To show this, experiments have been made, and the sole, frog, and bars have been removed entirely, and yet, as the horse stood, the coffin

bone did not protrude, nor touch the ground; but when the horse is in rapid motion, these fleshy leaves lengthen and suffer the coffin bone to descend and press upon the sole. In the upward movement of the foot, they contract again. This ascension and descension is an admirable mechanism for the destruction of violent shocks and concussions; for it eases the weight up and down the same as so many springs would do, and gives safety, as well as comfort, to the animal.

Another very important fact should not go unmentioned, in regard to the functions of these sensible laminæ. It is this: The outer sole-bearing surface is not more than twenty-five or thirty square inches, in the ordinary foot, but, by a little arithmetical calculation, we see that a hoof, of the same size, is supported by an actual surface of three hundred and forty-five inches for contact.

Let us calculate: There are six hundred and ninety fleshy leaves—received within horny plates—each of which is one-eighth of an inch deep, at least; each leaf has two surfaces, and will suppose each to be on an average, two inches in length; which would give us $690 \times 2 \times \frac{1}{4} = 345$ square inches.

Besides the coffin bone, the navicular bone, and part of the coronet or lower pastern, is found in the coffin-box.

The nut, or navicular bone (Fig. 1, B), is a small bone which, with the two named, forms the coffin joint. It is covered with a delicate membrane, very liable, upon the least injury, to become inflamed. The slighest disease of this membrane will render the horse lame, and generally, for life. The flexor tendon (Fig. 10, H) passes under this bone. It may be remarked,

however, that this bone, situated as it is—being protected on all sides—is not so liable to become injured, as many writers suppose. It being so deep seated, however, makes the cure almost impossible, when it is diseased.

The sensitive sole is situated between the coffin bone and the horny scale. It secrets the horn of the outer sole, and assists in preventing concussions. It is very sensitive, and the pressure by the shoe on the outer sole will cause bruises and inflamation of the sensitive sole.

The sensible frog lies just under the horny frog, occupying the whole of the back part of the foot. The front part is attached to the inferior part of the coffin bone, and further back, to the lower part of the cartilages of the hull. It is a soft mass, partly tendinous and partly ligamentous.

The sensitive sole and the sensitive frog play an important part in the expansion of the foot. The sensitive frog is an elastic bed upon which the navicular bone and flexor tendon can play with security. As the sole descends, the width of the lower part of the foot is increased, but this presses the sensitive frog out, and up—by the action of the navicular bone and tendon. The lateral cartilages of the foot are thus preserved—by the prevention of compression, which would ensue, were not the frog capable of such compression and rising.

A recent writer, in speaking of sensitive sole, says: "The use of the sensitive sole is to assist the horse, by the sense of touch, in placing his foot to the ground in such a way as to favor it, and to feed the outer sole with the material of which it is made."

The sense of touch to which I have alluded is a most essential power to the horse, for it enables him, in the very act and instant of placing his foot to the ground, to do just what all boys do when running with bare feet, viz.: favor that side, or section of the foot, upon which, by reason of the inequality of the ground, undue pressure is brought. It is not by his eyes that a boy saves his feet from contusion; there is a power located in his foot, a power of interpreting danger before it has become dangerous, by which, although his foot has actually struck the ground, he is nevertheless, able to throw the weight off from that section of the foot, which is being unduly exposed. A horse, in one sense, does feel his way along. The weight of his body is thrown upon this side of his foot, or that, this end or that, just as he feels the necessity of it; and this lightning-like adjustment of his weight according to the feeling of his foot, is caused by the action of a sense so quick, that it is done after the foot has actually come into contact with the ground. It is by this inner or sensitive sole, that the secretions which feed the outer sole are deposited. On the other hand, the outer sole has for its use the work of protecting the inner sole, both from contact with the ground and also with the atmosphere. This atmospheric contact, results in absorbing the natural moisture, until it becomes dessicated or parched, so that great cracks and rents appear in it, as a farmer in August, on a clay bottom, finds great rents and cracks in the soil. In short, the outer sole is Nature's shield and Nature's stuffing for the inner sole, to ward off on the one hand, the blows that might otherwise smite it ; and on the other hand to keep its juices, by means of which the sole of the foot is being supplied

with needed nutrition from being dried up. At this point, we may properly inquire, if this is the use and office of the outer sole, if it holds such an important rank in the order of natural provision for the sound condition and healthy growth of the foot, why is it ever pared away?

This is my answer: The reason is, because the people are ignorant, and blindly follow a stupid and barbarous custom, instead of pausing to reflect upon what they are doing.

Ask any smith why he pares out the sole of a foot, and he can give you no reason, save that he had been taught to do so. And who, pray, taught him? Some one as ignorant as he, I reply. And so generation after generation, a barbarous and indefensible act, has been committed, to the premature breaking-down of many valuable horses, the actual maiming of not a few, and the painful torturing of some.

No form of flesh is more sensitive to pain, than the inner substance of a horse's foot. Its powers of sensitiveness is like that which lies sleeping under a human finger-nail. To protect this from hurt and undue pressure, nature has put this hard horny shield, viz.: the outer sole; and yet I have sat and seen an ignorant smith hack and hew away this natural protection, until he could actually indent it with his fingers, and little drops of blood oozed forth from within. I imagine the feelings of the horse, after having been put into the shafts. He was driven forth into the dust and gravel of the streets, or sent pounding along a stone pavement with nothing but the thinnest possible filament of horn substance left between the exquisite inner organization of the foot, and the dirt, gravel, and stones on which he was traveling.

And yet this method of procedure, is not only tolerated by gentlemen of wealth and character, but vindicated and held up as the model (?) method of preparing the foot, for the emergencies of actual service.

Horn is a slow conductor of heat and cold, and when thick, retains moisture for a long time, and the flakes which are attached to the solid horn, act as a natural "stopping" to the hoof by accumulating and retaining moisture beneath. In addition to this, every flake acts more or less, as a spring, in warding off bruises, or other injuries to the sole; and thus the floor of the horny box is protected from injury internally and externally. Yet, the farrier, following out the routine of his craft, injudiciously pares the sole, until it springs to the pressure of his thumb.

The immature horn thus denuded and stripped of its outer-covering, immediately begins to experience the evil effects of external influences. It loses its moisture, dries, hardens, and shrivels up. It occupies a smaller space, and in doing so, the sole become more concave, drawing after it the wall. The stays against contraction are taken away, and the quarters and heels becomes narrowed, and the horse can not but go lame, even on smooth ground.

It must be remembered, also, that the secreting apparatus of the sole being deranged, new horn will form slowly, so much so, that, before the amount has been sufficient to compensate for the old, taken away, the horse must be re-shod, when this part must again be robbed through this senseless paring.

"Seeing therefore, the natural provision existing in the sole of the hoof for its diminution in thickness, when necessary, and knowing that the intact sole, is the

best safe-guard against injury and deterioration to this region, it must be laid down as a rule in farriery, and from which there must be no departure. That this part is not to be interfered with on any pretense, so long as the foot is in health, not even the flakes are to be disturbed.

Paring the Frog.—On this subject I feel I can not do better than quote what is given us by a good writer on the subject. He says:

"This part of the hoof is that which, in the opinion of grooms and coachmen, most requires cutting, to prevent its coming on the ground, and laming the horse; and this reason, together with its soft texture, causes it to be made the sport of the farrier's relentless knife. It is artistically and thoroughly trimmed, the fine, elastic horn being sliced away—sometimes even to the quick, and, in its sadly reduced form, it undergoes the same changes as have been observed in the pared sole. No wonder, then, that it cannot bear touching the ground any more than the sole. Strip off the skin of a man's foot and cause him to travel over stony or pebbly roads; would he walk comfortably or soundly?"

Lafosse, in 1754, wrote:

"The frog is composed of soft and compact horn, spongy and elastic in its nature, and serves as a cushion to the tendon—Achilles. It ought to bear fully on the ground as much for the facility as for the safety of the horse, when in movement." "It is," he adds, "the natural *point d'appui* of the flexor tendon." Some have supposed, that another use of the frog, was to expand the heels of the foot. They have an idea that it acts like a wedge, driven in between the bars of the foot, and that at every shock it receives, when brought

in contact with the ground, it is driven home, as it were, causing the walls and bars of the hoof to expand laterally. This lateral-expansion theory is at variance with good authority."

Murray says:

"It's a humbug. No knife should touch the sole of your horse's foot; nor the least bit of it be pared away. Nor to the frog; Nature never provides too much of it to answer the purpose for which the Creator designed it—and the larger it is, the more easily, swiftly, and safely your horse will go."

CHAPTER VII.

Thrush.

This disease is located in the frog of the foot, and is caused, sometimes, by letting the horse stand in moist dung; or by long, continued, and extensive application of "stopping"; or frequent wetting the feet in water, as a remedy for brittle hoofs.

If the thrush be neglected, it will become chronic, and affect the whole foot, The frog will shrivel up, the foot will contract, and the horse will go on his toes, to favor his heels.

Sometimes the frog will become inflamed, and then, instead of secreting sound horn, it will secrete a spongy substance; and, in this case, it will feel hot to the touch—will become very ragged, and smell foul.

Thrush occurs in contracted feet, which is due to he chronic inflammation of the sensible frog, and is brought on by improper shoeing; or neglect of properly paring the heels or surplus horn away, on the sole surface of the foot.

In bad cases, the sides of the horny frog have separated, so that by wiping out the foul discharge, the diseased sensible sole can be seen; and where the disease is very bad, and the sensible laminæ itself has become affected, it is with difficulty a cure can be effected.

The hind feet are more liable to this disease than the front ones, because, in our stable management, they are more exposed to the pernicious influences of dung and

urine. In the fore feet, thrush is usually connected with contraction.

REMEDY.—The frog should be kept dry, and the crevices thoroughly cleaned out and filled with pledgets of tow, dipped in warm tar, every day. The tar will keep the horn supple as it grows. The foot should be pared down level and straight, lowering the heels, in case of contraction, to let the frog come down, if possible, so that it will receive some little pressure from the ground. Or the bar shoe (Fig. 14) may be used, applying some degree of pressure, by means of the tow, which may be stuffed in, so as to compress the frog; beginning with slight pressure, and increasing it as the new horn grows.

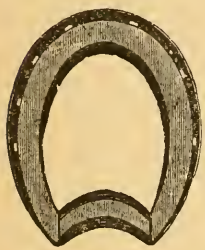


Fig. 14.
The Bar Shoe.

A thrushy foot, should receive every atttention needed, until the frog be restored.

CHAPTER VIII.

Outer Contraction.

This subject invariably has been treated with indifference. The real trouble has been in not discriminating between the harmless effects of many feet contracted outwardly, and others contracted inwardly. We give cuts of these deformed feet, which will show fully wherein the trouble lies in the one case, and how the harmless effects are produced in the other. By reference to Fig. 15, we have a hoof contracted outwardly, as seen in the cut. The horn on the ground surface, (C C), is wired in, so that the foot is larger around the coronet, or at B, B, than it is on the sole surface. By contrasting it with the perfect foot, we find that the heels are closed in too much, but on the sides, or lateral parts, the foot does not seem compressed, so we would infer that the wings of the coffin-bone and cartilages thereto, are intact, or if any undue pressure has been communicated to the bones, cartilages and nerves within, the change in the position of the coffin-bone, has been such as to accommodate itself to this pressure, without detriment, and such we find to be true upon investigation.

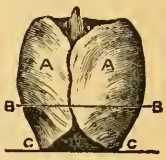


Fig. 15.
Outer Contraction.
A A—Back view of the foot.
B C—Lines showing to what degree contracted.

The tendency with feet contracted outwardly, is to walk on the toes. This tip-toeing it along, soon wears

down the front part of the foot, and gives us this unnatural shape. Small feet are more liable to contract than large ones, and especially, when the heels are not strong.

Smiths are sometimes to blame for not paring off the surplus horn of the wall, on the ground surface. I have seen the frog deeply imbedded an inch and a half above the ground surface, and the encircling horn, so grown, that when the foot was inverted, it looked like a minature wash-tub, having the under surface of the sole for a bottom, placed about one-half way down.

Then, again, the trouble is sometimes produced by the smith paring out the sole; for, when it becomes thin, it loses its moisture, and having done so, it acquires hardness. Then the new flakes begins to exfoliate, or peel off, and the sole becomes denuded of its protection, and exposed to external injury. When the horn is thus stripped of its outer covering, it begins to experience the evil effects of external influences by losing its moisture becoming hardened, and finally, shriveling up.

This shriveling up, will confine all parts to a smaller space, and in doing so, the sole will become more concave, drawing after it the outer wall, the foot will decrease in size, and the quarters and heels will wire in.

If the unshod foot be left run at grass, the surplus horn will be disposed of by the wear and tear of friction alone, the frog will descend, and the foot, by Nature's curative processes, be kept healthy, but if the smith gouges out the frog and tears down the bars at each shoeing, by the time he fully perfects what Nature has left unfinished, the hoof is so mutilated, and hewed away, it can not but contract. There is no mischief done in cutting away the foot when done properly. "Mischief is only the result of improper paring," says Blaine. For the

hoof is continually growing, the crust is continually lengthening and the sole is thickening. Such is a wise provision for the foot, in an unshod state, but when the foot is protected by a shoe, and none of the horn can be worn away by coming in contact with the ground, its growth continues, the horn gets high, the sole thick, the frog elevated, so that the descension of the sole and the expansion of the heels are prevented, and contraction is the inevitable result.

The smith could lessen the evil, if not prevent it altogether, by carefully lowering the heels at each shoeing—and this should be done once in every three weeks; and no shoe should be kept on the hoof longer than that time before being re-set.

The expanding shoe (see Fig. 16) is used by Mr. Russell for outer contraction. The plan can be easily understood by an examination of the cut. The heels of the shoe are sprung together as much as the foot is required to be expanded; then fastened with the clasp C, and nailed on the foot; after which the clasp is removed, and the foot will gradually expand until the shoe regains its natural shape. By this shoe the heels are not forced asunder at the expense of total separation of the portions within, but in a gradual manner, until the foot assumes its natural form. This gives a chance for new laminæ (if diseased) to grow, and the bones within to correctly adjust themselves to their new positions.

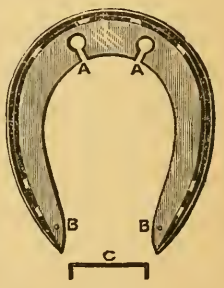


Fig. 16.
The Expansion Shoe.
A—Showing how it is weakened by holes in the web.
B B—Holes into which the clasp C is fastened.
C—Clasp used to hold the heels together when they are sprung up.

CHAPTER IX.

INNER CONTRACTION.

The most mischievous results follow in contracted feet, when the lateral walls or sides of the foot are compressed, as seen in the annexed cuts. The hoofs, in these cases, have been neglected, and, in consequence, the outside crusts, just below the coronet, contracts and spreads itself on the ground, until it has become like an inverted butter-dish. The compression, in Fig. 17 is simply on the sides of the foot; in Fig. 18, the heels, as well as the lateral walls, are wired in. In either case, the compression differs from that of outer contraction, in being midway between coronet and ground surface, instead of at the ground surface.

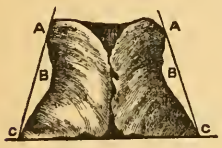


Fig. 17.
Inner Contraction.
A—The Coronet.
B B—Crust or wall compressed.
C C—The ground surface of foot.

Fig. 18.
Inner Contraction,
A B—Showing the twisted heel wired in.

Inner contraction, is serious, inasmuch as the wings of the coffin-bone, the lateral cartilages of the foot, and nerves coursing along each artery, suffer by compression. When the nerve of the foot is touched, the life of the foot is endangered; and when the nerve becomes destroyed, the foot itself becomes dead, not only changing the tough living crust, without, to a lifeless, brittle mass, but also the bones within to a like condition. The cartilages will ossify for want of nutriment, and the joints will lose their action.

The compression of the lateral wall will also change

the position of the bones within the foot. The heel of the coffin-bone, will in many cases become raised, and will incline to the perpendicular, but this results in simply pulling the toe of this bone, away from the inside toe of the coffin-box. This disengages the sensible laminæ at that point, and Nature starts a fungus growth of horn, in the diseased laminæ, to assist the weakened torn-down sensible. This partial and unnatural erection of the coffin-bone at the heel, throws the weight of the horse on the outside heel of the hoof which, in inner contraction squelches the heels outwards, and permits an increase in the length of the toe, by this morbid fungus growth before mentioned.

Again, in proportion to the height or neglected growth of the ground surface of the foot, it will close in around the coronet. A horse having low heels, at grass, with a hoof kept elastic and supple, by the natural moisture of the ground, like the unshod colt, with liberty to run, will never have contracted feet ; but if shod, and then stabled on wooden floors, the hoof become hard and brittle, and thrush sets in as a consequence, and if the smith gets a hack now and then at the bars and frog, with his knife, contraction will ensue.

Shoeing is undoubtedly a necessary evil, but this kind of work of tearing down bars and leveling frogs of a contracted foot, is curing a disease, "with a vengeance," before a horse has it. The bars are the main impediment to contraction. The frog, of course, should be left untouched, but the toe should be rasped short, the heels lowered and the quarters weakened, and the horse be turned out with tips—only at first—and afterwards, shod with the expanding shoe, and be put to light work only. It will take some skill, time, and care to effect cures in bad cases.

CHAPTER X.

FOUNDER, OR LAMINITIS.

Founder and fever of the feet consists in inflammation of the parts between the crust or wall and pedal bone, including the laminæ connecting the coffin bone (pedal) to the inside of the hoof. This space is so small that any inflammation whatever will be accompanied with great pain.

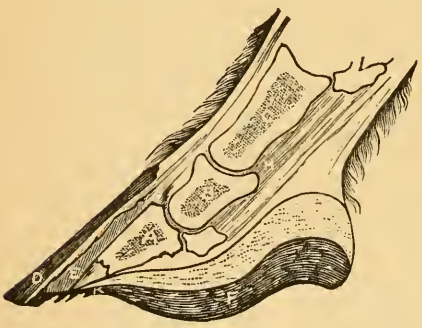


Fig. 19.
Section of the Foot.
A—Coffin Bone.
B—Coronet or lower Pastern Bone.
C—Upper Pastern.
D—Outside crust or shell of foot.
E—Space between coffin bone and crust of foot.
F—Sole bulged out, showing flat foot.

There are several causes of founder. If a horse be ridden or driven hard, be suffered to stand in the cold, or if his feet be washed and not properly dried, he is very likely to have fever in the feet; also the mechanical irritation of hard roads, on feet not used to them; or sometimes by long confinement in a standing position, will induce the disease. The sudden change from cold to heat (the same as from heat to cold) is also dangerous. Also, it must be remembered that, by our system of shoeing, the laminæ is made to support the whole weight of the body, so as to prevent the frog from touching the ground, which greatly assists in inflaming the sensitive laminæ by so much pounding and concussion.

The early symptoms of the fever in the feet are shown by the frequent changes of position of the fore-legs, as the horse is fidgety, and is constantly shifting the weight from foot to foot. The pulse becomes quickened, and the horse shows by his countenance and by his moaning, that he is in great pain. If he should lie down, soon after the first attack of the disease, it will show that the feet are inflamed instead of the lungs. The horse, generally is obstinate, however, and persists in standing until he drops from mere exhaustion, and when lying down, so much relief is obtained, that it becomes difficult to get the horse again on to his feet, where the weight would painfully distend the little inflamed leaves, or, little sensible plates.

If the feet are hot, and the horse suffers great pain, no great time will pass before he will be unable to get up, or if raised on to his feet, drop at once from the intensity of pain.

Bleeding at the toe freely, is indispensible. But we leave the treatment to the veterinary surgeon, who should be called immediately.

The cure is not an easy one, and the loss of the hoof is not unfrequent; and, although a new hoof may be formed, it will be smaller in size and weaker than the first, and will not stand much hard work.

The sensible and horny plates, in consequence of the intense inflammation, will have lost much of their elasticity; and, in consequence, the coffin bone will drop unsupported on the sole and produce

Flat or Pumiced Feet.— By reference to Fig. 19 or to Fig. 20, we see the sole flattened or even convexed, showing that the coffin

Fig. 20.
Section of Foot, showing Drop Sole.

bone has been thrown on the sole, in consequence of the sensible laminæ not having strength to support the weight of the horse.

For a badly diseased flat foot, there is no cure—all that can be done is by shoeing. Nothing must project upon the pumiced part; and if the sole should have descended much, this shoe, with a wide web (see cut) beveled off so as not to press upon the part, can be used to advantage.

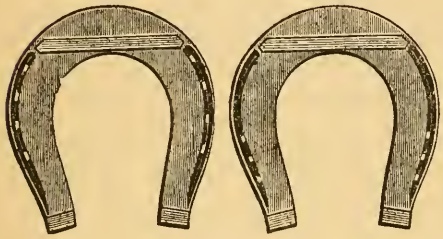


Fig. 21. Fig. 22.

Shoes for Flat Feet, showing where to nail.

CHAPTER XI.

Corns.

Corns are often times caused by improper paring, and leveling the foot, which throws the weight to one side. The pressure brought in this way, if upon the sole, under the back part of the heels of the coffin bone, will cause a bruise, hence the corn.

Contracted feet are seldom without corns, because that part of the sole between the angle formed by the bars and the outside crust, is so squeezed as to become inflamed. Contraction is occasioned, it will be remembered, by tearing down the bars, and opening up the heels, and which will cause the sole to be bruised at this place.

When the pressure on the sole is sufficient to produce irritation, a small quantity of blood is forced out, and the horn then secreted, is in a less quantity, and of a more spongy nature, and this blood becomes enclosed in it.

Sometimes corns are caused by permitting the shoe to remain on the foot too long, when it becomes imbedded in the heel, the external crust grows down on the outside of it, and the bearing is thrown on this angular portion of the sole. Sometimes the shoe becomes loosened at the heels, and corns or bruises are caused by the stone or gravel insinuating itself between the shoe and the crust, and every step the horse takes causes friction on the sole. The same effect is produced when the shoe is nailed only on the toe, and allowed to spring off of the heels. The shoe should be fit snugly up to

the wall all round, then if the feet are pared level and straight, giving a level sole bearing surface, there will not be so much danger of the horse having corns.

The centennial shoe (see Fig. 23) has been used for corns, the intention of the projecting wings being to throw the pressure on the wall and bars, the same as the unshod hoof does. But the difficulty in the use of this shoe is this: the foot being concave, the angle formed by the crust and bar, must be cut down low, to let the wings of the shoe rest on the bars of the foot; this weakens the heel. Then, too, if pressure should come upon this part of the shoe, and it becomes bent, most serious trouble will arise; the same as would be in the case of a stone between the shoe and the foot.

Fig. 23.
Centennial Shoe.
A A—Wings at the heel of shoe to rest on the bars of the foot.

Another trouble arises sometimes, by making any shoe used too short, for in this case, after the foot grows a little, the heel of the shoe gets within the angle of crust and bar, and by the constant friction, soon makes a callous spot.

The corn should be dug out until you come to the blood, and then be burnt out with a pointed hot iron, to create a different sore, after which a little salve of some kind, as pitch, or tar, should be put in, and a long shoe put on, to cover the braces, but ease the pressure on the callous heels, to keep off the pricking, or pressing against the tender portions of the foot.

The centennial shoe has its uses in particular cases; we do not wholly condemn it, but, like any shoe, it must be fitted with reference to the foot upon which it is to be placed, and it may answer its purpose.

CHAPTER XII.

Quarter Crack.

There are several causes of quarter crack; first, when the coronary ligament by which the horn is secreted, becomes divided, there will be a division of the horn as it grows down, either in the form of a sand-crack, or (as seen in Fig. 25) by one portion of the horn overlapping the other. If the ligament is affected from tread (by the stepping of one foot on the other, or otherwise), and the coronet divided, the crack should be thoroughly cleaned out, rasped or pared, to ascertain its depth; and then a heated iron, applied; after which a coating of pitch put on, with coarse tape bound over, and covered by another coating of pitch; and the centennial shoe used, resting the bars of the foot on the bars of the shoe, but taking care that no pressure is brought to bear upon the crust, immediately under the crack. The crack may be caused by the crust, or outer wall, becoming very thick and strong, and the heels allowed to grow very high. The sole, in this case, being concave on the bottom, and also very thick, makes the whole foot so strong and

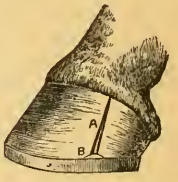


Fig. 24.
Quarter Crack.
A—The crack beginning at coronet and running to ground surface.
B—Showing how cut out to keep pressure off the affected part.

Fig. 25.
A—Showing the evil effects of a crack in the sensible laminæ.

solid, as to deprive it of all elasticity. The horse, in motion, springs from his toe and lands on his heel; but having no springs in his hoofs to soften the jar, the foot must give, which it generally does near the heel, producing quarter crack.

Such a foot, for the reception of the shoe, should be well pared. The outer wall or crust should be rasped down from coronet to ground surface, as far back as the quarters, to give this part of the foot a chance to expand; and the toe should be well shortened up. The shoe should be nailed solidly to the heels and neatly up to the wall of the foot, so as to utilize all the bearing; but a space, the thickness of a knife blade, should be left between the toe of the shoe and that of the foot. Let no pressure be brought on the toe, nor allow the shoe to spring off of the heels.

A crack in the hoof may also be caused by improper stabling, on wooden floors, causing the horn to become dry and brittle, and, upon receiving hard pounding on dry roads, is liable to crack; or the sensible laminæ may become weakened, and allow the coffin bone to drop on the sole, and, in part, produce flat foot (see Fig. 20). If, now, the hoof should become lifeless and brittle, and the cartilages within ossified, the bones and ossified cartilages, being harder than the brittle shell without, will crack the outside crust when the horse is in violent motion. In this case, dress the hoof, as before, and use the shoe (Fig. 26), with toe and heel calkins of the same length. The clips (see A A) are used to keep the heels from spreading. The toe and heel calks should be of the same length, to keep the foot always level. The toe

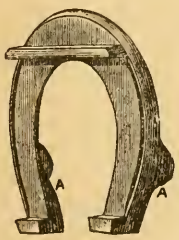


Fig. 26.
A A—Showing clips on the shoe.

of the shoe should be set back from the front part about two inches, and should be long enough to reach across from one side to the other.

Coupling the foot so short, in this way, will ease it over in case the joints have lost their action, from the ossified condition of the cartilages.

These cracks occur in the hind feet as well as in the fore ones; but they are generally found in the front part of the hoof, because the principal stress is thrown on the toe, in digging it into the ground in the act of drawing.

Fig. 27.
Showing the crack of the crust in the hind foot.
A—The crack.
B—The toe scored out to relieve the pressure.

In the fore feet they are usually found in the inner quarter, in consequence of its being the weaker; but sometimes are found in the outer quarter.

The steel shoe (see Fig. 16) may be used to good advantage for split-foot in front.

CHAPTER XIII.

THE HOCK.

There are six bones that compose the hock-joint of the hind legs, the most important of which, is the hind-most one. It projects upwards and backwards, and in this way, gives not only a leverage capacity to raise the leg, but by its prominence, that power also necessary to sustain the weight of the horse, and to propel its weight forward. The hind legs differ from the fore ones in this respect, the propelling muscles being located in the hind-quarters. Hence, a good, large hock is necessary in hard work. The size differs in different horses.

The hock-joint is subject to a number of diseases ; one is curb. Sometimes this joint is curved instead of being angular, in which case the back sinew running over the edge of the hock, works at a disadvantage, and will burst the ligament, that holds it in place at the lower end of the joint. The danger is increased on this circular ligament, if the hocks are turned toward each other, (cow-hocked). When the ligament is broken, inflammation will ensue, followed by an enlargement of the hock.

CHAPTER XIV.

Spavin.

Bone Spavin, is a bony enlargement at the upper end of the shank bone, at the hock joint, or a little below it on the inside of the leg. This is brought to bear by an undue strain upon this side.

Heavy draught horses, and young horses, before the bones are properly knit together, are the most subject to it.

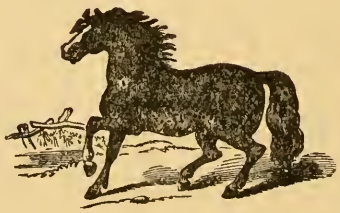
It will be remembered, what we have said before, in regard to throwing the weight of the horse too much on one side of the foot, which will cause an enlargement of the splint bones, (see Fig. 1—7). When this is done in the hind leg, upon the inner splint bone, the pressure is brought to bear unevenly upon the bones of the hock joint, and causes this new growth of bone.

The smith, sometimes, by putting a calkin on the outer heel of shoe to prevent one foot from treading on the other, causes this trouble, thus giving an unequal bearing, which will strain the ligaments of the joints; hence, the tumor called bone-spavin.

When a horse has become affected with a spavin, he is generally more lame when the new bone is forming, than when the membrane of the bone, has accommodated itself in size to the tumor, which it surrounds. Thus it is, that some horses with very large spavins, have but little lameness, and others with a very small bony tumor get so lame as to destroy the usefulness of the horse.

Fig. 28 shows a hind foot shoe, that can be used for spavin or curb to good advantage. These shoes extend about three-quarters of an inch back of the heel, which will shorten the down action of the foot. The heel calkins are one-fourth of an inch higher than those at the toe. A high heeled shoe will be awkward at first, but it will, it is believed, relieve the joint of the strain upon it. The projections of the shoe behind will destroy, in a measure, the down and up movement, which will shorten the stride. We will presently discuss this subject more fully.

Fig. 28.



CHAPTER XV.

The Navicular Joint Disease.

This is a disease that must be turned over to the veterinary surgeon, and then, the cure is extremely uncertain, especially if it be in contracted feet.

The navicular bone, it will be remembered, is behind and above the heel of the coffin-bone, and below the lower pastern bone, (see Fig. 10, B.) It is one of the three, that forms the coffin joint. Under this bone, passes the flexor tendon, the bone itself, serving the tendon, in the capacity of giving it more leverage which causes a great deal of weight to be thrown upon it, and from this bone on the tendon.

Now, if there is too much play between the bone and the tendon, or, if the cartilage of the bone is affected in any way, the delicate membrane, lining this bone, may in consequence become affected, which is the seat of the disturbance; although the coffin joint, may be the seat of the lameness.

The trouble may arise in contracted feet, by the compression of the inner frog, which will interfere with the action of this joint. If the feet are not contracted, the sole should be pared, the quarters rasped, and a shoe used without nails in the inner quarters, so as to remove all surrounding pressure.

CHAPTER XVI.

SHOES FOR DIFFERENT FEET.

Every horse should be shod with reference to the work he is required to perform; also, for the particular shape, defect or disease, he may have in his feet. This makes it impossible to lay down anything more than general principles. Special rules to be governed by can not be given, as what will answer in one case will not always do in another. The owner of the horse and an intelligent smith, alone, know what is best, and then only in some cases, after many experiments have been made. However, we will make a few notes in a general way.

The foot of the draught horse should be left good and strong—more so than the roadster or track horse—the same as the mule, for heavy work, as he throws all his strain on his feet in heavy pulling, and when driven over rough and stony places he is more liable to pick up stones and nails to bruise himself with. For this reason, let the sole be good and strong. The outer wall of the foot should be rasped as little as possible, as this destroys the enamel and subjects the horn to hardness and brittleness. Clipping is necessary sometimes, but clipping hot, and burning the clip into the toe, is very destructive to the sensible laminæ, and often causes a spur (see

Fig. 29.

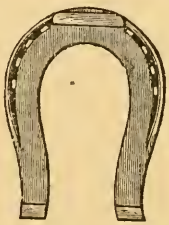


Fig. 30.

Fig. 25, A) to shoot up on the inside of the coffin box, causing the coffin bone to decay and waste away at that place. I have seen it reduced in this way to one-half of its original size.

The mule's foot is differently shaped from that of the horse, and must be shod differently. It is longer and requires a longer shoe (see Fig. 29). It is, in form, like the contracted hoof—the horn being upright, especially at the quarters. And yet, because the mule is seldom or never lame, it does not follow that a horse's foot, when contracted, will not sometimes go lame—as it is altogether differently formed.

Any one can readily see that for heavy draft purposes the horse or mule, with his wide slab-like shank bone, large hocks and short pasterns, should be shod suitable for slow, heavy work. The shoe shown in Fig. 31 is sometimes used to allow a space between the toe of the shoe and toe of the foot; this saves the horn at that part, when the foot is weak, and that space is left to take pressure off the toe.

Fig. 31.
A A—Shoe cut down in front so as to allow a space between toe of shoe and toe of foot.

The saddle horse needs some wind and some bottom, and must have good legs all around; enough action to lift and place his foot properly; a pastern of the right length so as not to stumble; or he must have a shoe properly coupled, if calks are used to prevent it. He must perform the work of a hackney, and, as such, must be shod so that he will not carry his feet too high; or if the tendency is to dig his toe into the ground, before

Fig. 32.
English Seated Shoe; for Saddle Horses.

the foot is firmly placed, the smith must correct this, if possible, as he is liable to topple over, when he strikes some object in the way.

If the saddle horse approaches the thoroughbred, he becomes the less fitted for this especial business. His stride, then, is apt to be too long; his pastern too slanting; and his feet too small. His feet should be perfectly straight, neither turned in, nor out, and should be kept so by the smith; and his hoof should be properly balanced all around, from coronet to ground surface. Use the shoe (Fig. 32) with the inside part of web beveled off, or made concave, that it may not press upon the sole; for the sole descends when the foot is placed upon the ground, and, if the shoe is flat on the sole side, or side next to the foot, the occasional pressure would bruise the sensible sole between the horny one and the coffin bone. The concave shoe, by its being beveled, prevents the possibility of such injury.

While horses are traveling, dirt and gravel are apt to get in between the shoe and sole; but the shoe being beveled, in this case, they will be shaken out. A flat shoe would retain them—this shoe is flat on the ground surface only.

The foot should be pared, so that the frog will come just within the level of the ground surface of the shoe, so that, in the descent of the sole, the frog will touch the ground. Fig. 33 shows a shoe of a different kind, and how the action may be quickened, by rolling it, or beveling it at the toe, from the inside of rim, or web to the outside.

Fig. 33.

The owner of the horse must determine what weight of shoe the horse can best carry,

with most ease to himself; and in this, care and judgment should be exercised, as it is important that the shoe be not heavier than is really required, for every additional ounce in weight, beyond what is necessary, requires, during the entire work of the day, a consummation of muscular energy, even in the hackney, that is truly appalling. The horse will raise his foot at least fifty times a minute, or three thousand times an hour; and all four feet, at this rate, sixty thousand times a day of five hours work—so to carry a shoe of two ounces unnecessary weight, he would waste power and expend enough enough to move a weight of seven thousand five hundred pounds. The point is one worthy of consideration, at least.

In the trotting horse every inch of his stride counts in the race, and if, by shoeing, the stride can be lengthened, the speed can be increased. Fig. 34 shows a shoe made light, not over eight ounces, snugly fit up to both sides of the frog, at the heels, to quicken the action of a horse. If it was beveled at the toe and thick at the heels, it would also increase the speed by letting the horse get his foot over quickly. But the main point in this shoe is the snug fit at both sides of the heels; for, in this case, the downward movement of the foot, when the horse is in motion, is not impeded by the shoe. A horse with a long pastern, in a full gait, almost sweeps the ground with the tuft at his fetlock joint, and the downward motion not being impeded, he can get the quick up motion in return when the foot is lifted; but if the downward motion is destroyed, the quick up motion is likewise injured, and the flexor tendon is hindered or impeded in its up and down movements.

Fig. 34.
Hind Foot Shoe to quicken the Action.

By reference to Fig. 35 it can be seen how the projections of the shoe at the heels will interfere with the down movements of the foot, and the full exercise of the flexor tendon. That down movement is destroyed in part, and the action of the heel is checked, which also destroys the springiness of the foot, in getting the rapid and quick up movement. It may do very well for colts or horses that overreach, by slowing the action behind, but if it is done for the track horse, there may be, in consequence, some races lost; for, destroying this quick up and down action shortens the stride of the horse; and that, too, in proportion to the projections of the shoes behind. Now, the average stride of the fast gallop is twenty-four feet, and that of the trotter about seventeen feet; so we can readily see, that if we slow the action enough to shorten the stride but one half inch, how it would sadly tell at the end of the race.

Fig. 35.
To slow the action of a Horse behind.

Showing projections of shoe behind to interfere with the down action of the flexor tendon.

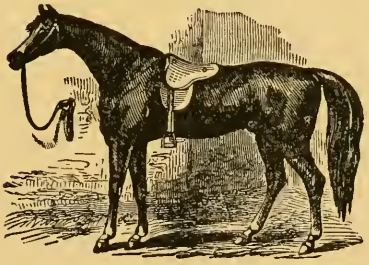
Square toe calk, one and one-half inches high.

The toe-weight shoe is used in changing the gait of a horse, and in giving him good knee action. It acts on the same principle that weights in the boy's hands do in obtaining a spring for a leap. The foot being thus weighted necessitates, in some cases, the horse's carrying his head up, for one pound of the foot is equal (in proportion to the length of the lever) to several at the seat of the propelling muscles in the fore arm, above the knee. It thus balances the horse the same as done by his lowering the head.

Fig. 37.
The Toe-Weight Shoe.

The Racing Plate is a very light, narrow rim of iron from two to three ounces in weight, and only about half an inch in width. The under side is grooved.

Fig. 38.
Racing Plate.



CHAPTER XVII.

INTERFERING HORSES.

Interfering horses are those that strike their ankles, or strike one foot against the inside of the fetlock joint, called ankle cutters; and those that cut from the knee down, called speedy cutters. There are several reasons why horses cut; the principal one is, that they are not shod properly. They will cut, sometimes, from leg weariness or from awkwardness; sometimes from being deformed in the fetlock joint; and even, sometimes, when their ankles are turned out, in consequence of their being bow-legged behind.

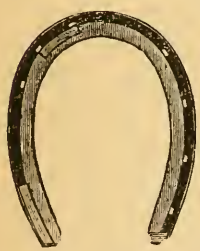


Fig. 39.
Hind Foot Ankle Cutter.
Toe calkin on inside of toe.
Long heel calkin on inside of heel.
Small heel calkin on outside of heel.

There are many and various ways of shoeing for this. We give several cuts, showing the different shoes used to prevent it. It is not always the case that the same shoe will do for more than one horse. In case, for example, the more you raise the inside of shoe, (Fig. 39) the worse a horse whose ankles are turned out, in consequence of being bow-legged, will strike; yet, when the shoe is highest on the inside, with

Fig. 40. Fig. 41.
Different Styles of Shoes.

two or three nails only, on inside near the toe, then, if the foot is pared properly, the shoe will, in many cases, stop the cutting; but if the horse is bow-legged, the opposite must be followed, for the more you raise the foot on the inside, the more it will strike. Figures 40 and 41 show how the the shoes are beveled to let the horse miss, in getting his feet over. Figure 42 gives the cut of a shoe used sometimes for elbow or arm cutting, showing a gradual tapering in the width ot web, from heel to toe.

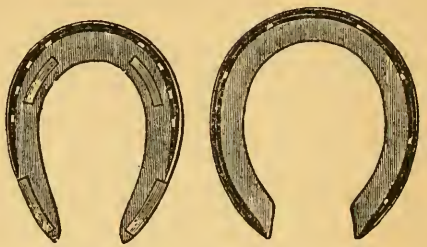


Fig. 42. Fig. 43.
Different Styles of Shoes.

Horses that have high action, are generally (if they cut at all) speedy cutters, and, in this case, it is invariably done in fast driving. The shoe with a tapering web, will, in some cases, prevent this.

A horse whose toes turn out, and ankles turn in, will strike from the quarters back to the heel, and is an instance where interfering can only with difficulty (if at all) be stopped.

If a boot is fastened over the place where the foot strikes, and then covered with chalk, the horse, by being trotted over the road, will show where he strikes, and where to alter the shoe; sometimes a very small matter causes the mischief.

Forging or Over-reaching is caused, sometimes, by the front of the toe of the hind shoe striking against the heel of the fore shoe (generally the outer heel); and sometimes, when the horse, after raising the front foot from the ground, dwells in the action, the hind

foot follows quickly, and forces itself into the opening of the fore shoe before the foot gets out of the way. In either case, it produces that click-click, disagreeable sound.

A good way to prevent this, is to make the hind shoe, narrow at the toe, rather pointed, with the toe projecting over the shoe, and with a small clip in the center. Now, as the front shoe is turned up, the projecting horn of the hind shoe will be stopped by the sole or frog, before any part of the two shoes can come together. Again, if the front shoe is beveled inwardly, (as in Figs. 41 and 43) to a feather edge, the trouble may be avoided.

Only horses that are straight travelers strike; pacers, of course, can not, nor trotters that throw their feet out well. For those that travel straight, a shoe beveled or rolled on the outer quarter, *may* cause them to throw their feet differently (Figs. 40 and 41); or a shoe to slow the action of a horse behind (Fig. 35) may do in many cases.

CHAPTER XVIII.

Canker.

When the sole is wounded or pricked by nails, pieces of glass, or sharp, flinty stones, or the little fleshy plates are wounded by nails in shoeing, it will sometimes lead to Canker—although Canker is more often the result of neglected thrush, than it is of any other disease of the foot. It is oftenest found in heavy cart horses; and, horses with hairy white legs, and thick skins. It is sometimes hereditary. When a foot is diseased in this way, the horn is separated from the sensible part of the foot, and a fungus matter sprouts up in the space occupied by a part, or may be, the whole of the sole or frog.

The cure of Canker is most difficult, and is the business of the veterinary surgeon, but the smith may do much to prevent it in not using such enormous shoes as is done sometimes—and which require so many large nails to hold them on, and subjects the feet to so much awkwardness as to cause bruises and treads on the coronet. The owner of the horse may also prevent it by keeping his stables free from filth, which induces thrush—the original cause oftentimes of Canker.

Grease.—This is a disease of the heel of either of the fore or hind feet, resulting in the inflammation of the skin.

The skin of the heel, in a healthy state, has a greasy feel, but when the skin, at this place, is diseased,

the inflammation stops the secretions, and the heel becomes chapped and cracked, and full of soreness. These cracks are found at the center of the heels, sometimes on the fetlock, and even up the legs.

There are several causes of Grease: want of cleanliness in stables is one, sudden and extreme change of temperature, want of exercise has a tendency to excite inflammation in the skin of the heel, and sometimes when the horse has been warmed by his work and then suddenly cooled off by cold washing, and the heels not properly dried, may cause Grease.

The disease results from mismanagement and neglect. It is not found in our cavalry, and should not be found in the stables of the gentleman and farmer.

WEAKNESS OF THE FOOT.—Weak feet often present the same appearances as the pumiced foot—in having a crust full of ridges, and roughened in circles or rings; and, also, the indented hollow midway between the coronet and ground surface at the toe.

The form of a weak foot is very well shown in Fig. 7, but the sole is not always convexed, as in flat or pumiced feet. The bars are small in size, the heels low and weak, and crust very thin. The foot is not able for anything more than light work, and should be shod only with a light, wide, concave, webbed shoe—with little or no paring of the hoof at the time of shoeing.

QUITTOR.—This often arises from bad tread, or over-reach; or it may arise from a wound in the bottom of the foot; or from a nail in the foot, or stub of a nail, which has been left in the wound, and the small aperture which was made, closed up, so as to shut in the matter then formed. This matter will force its way

through at some place; it may be at the bottom of the foot, where it will separate the horny sole from the fleshy one; it may ooze up and out at the coronet; and it may so affect the whole foot as to injure the cartilages, ligaments, and coffin joint.

Sometimes a narrow webbed shoe will leave the sole of the foot exposed, and the foot will receive bruises that will lay the foundation for Quittor. Flat feet are very liable to be bruised; also, feet where the sole has been pared out too closely. The matter wherever formed, will produce ulcerations; this will separate the sensitive parts from the horn; that can not easily (if it can at all) be again united.

A foot diseased thus with Quittor should be turned over to an experienced veterinary surgeon.

CHAPTER XIX.

WHAT GREAT WRITERS SAY ON SHOEING HORSES.

Mr. Miller, in quoting Miles, takes the following directions from his excellent treatise on horse shoeing:

PREPARING THE FOOT.

"You must begin by taking off one of the old shoes; and I say one, because the others should always be kept on for the horse to rest upon.

"All horses stand quieter on shod feet than they do on bare ones; and they are less likely to break the crust. Many tender footed horses are in positive agony when forced to rest on a bare foot, while the opposite one is held up to be shod.

"First, raise all the clinchers, with the buffer; and if the shoe will not then come off easily, loosen some of the nails with the punch; but never tear the shoes off by main force; it splits the crust, widens the nail-holes, and destroys the horn.

The shoe being off, you should rasp the edge of the hoof all round, and take out any stubs that may be left in the crust; then you must pare out the foot; and this requires both care and thought.

"If the horse has a strong foot, with plenty of horn you should shorten the toe, lower the heels and crust, and remove the dead horn from the sole; and also from the corners between the heels and bars.

"The best way to do this, is to pare the bars down nearly level with the sole: and then you can get at the dead horn in the corners, more easily. The part of the bar which stands up above the sole, would have been worn away or broken down, if the shoe had not kept the hoof off of the ground; therefore, you had better always pare it down. But, on no account, ever cut anything away from the sides of the bars, nor what is called 'open out the heels'; and be sure you never touch the frog with a knife. Now, remember, that there are three things which you must *never* do, in paring out a foot; you must never cut the sides of the bars; nor open out the heels; nor pare the frog—and I will tell you why:

"The bars are placed there to keep the heels from closing in on the frog; and if you thin them by cutting their sides, you weaken them, and they can no longer do it, and the foot begins to contract. Opening out the heels does exactly the same thing, by weakening the very parts which Nature placed there to keep the heels apart. It takes some time to contract a horse's foot so much as to lame him; and because the contraction comes on by slow degrees, no one notices it till the horse falls lame, and then every one wonders what can have done it; but very few hit upon the right cause.

"The frog is a thick, spongy cushion, whose chief use is to protect a very important joint called the navicular joint; and it is covered by a thin layer of horn, which keeps in the moisture; and every time you slice off any of the frog, you lay bare a part that was never meant to be exposed to the air; and it dries, and cracks, and forms rags; and if these rags are cut off at every fresh shoeing, the whole frog becomes as dry and hard

as a board, and the horse gets an incurable disease called the 'navicular disease.' Therefore, I say, leave the frog alone; it will never grow too large, for, long before that would happen, the outer covering would shell off, and a new horny covering will be found underneath. As to the rags, leave them alone, also, and they will fall off themselves.

"A weak, flat foot will bear a very little paring or rasping. The crust of such a foot is sure to be thin at the toe, and low at the heels, with a thin and weak sole. Therefore, the less you do it, the better, beyond making the crust level where it is to bear upon the shoe. This must be done to all feet, and, as the inner quarter, where there should be no nails, does not not wear away as fast as the outer quarter, where the nails are driven, you should always place a rasp upon its edge across the foot to be quite sure that the two sides are level. I have known shoes lost from the inside quarter being higher than the outside, which causes the foot to bear unevenly on the shoe. Before you pare out a foot, you should always think of the state of the roads; and if they are dry and covered with loose stones, or have been lately repaired, you should take but very little off of the sole of any foot, because, if you thin it, the stones will bruise it; and when the season is wet, and the stones worn in, you may pare the sole of a strong foot a little, till it will yield in a very slight degree to the heaviest pressure you can make upon it with your thumb; but you must never pare it thin enough to yield to less pressure than the very heaviest you can bring to bear upon it.'"

We think that these views of Mr. Miles are sound, and will add, that the owner will find it oftentimes to his advantage to accompany his horse to the forge.

Smiths do not always take the trouble in raising clenches, and easing the shoe off as they should, but too often, after carelessly going round the crust and raising but one or two, by violent wrenches at the heel and toe, tears the shoe from the foot. This enlarges the nail-holes, and oftentimes injures the foot by tearing off portions of the crust. The clenches should always be raised or filed off, and when the foot is tender and the horse is lame, each nail had better be partly punched out.

Choosing a Shoe.—The same author remarks that the first thing to look to in choosing a shoe is the kind of foot you have to deal with. If the foot be a strong, good shaped one, it will be an easy matter to find a shoe for it, only take care that the web is not too narrow, and that the shoe is not too light. A light shoe is apt to bend before it is half worn out, and the pain caused by the pressure of the bent nails against the tender lining of the hoof throws the horse down, and most likely breaks his knees. If the foot should be flat, with a weak, brittle crust, you must still choose a stout shoe, for a horse with such a foot could not go at all on a bent shoe; and the shoe must have a wide web, because the sole is sure to be thin, and will need plenty of cover to protect it.

You must look at the seating, for, if the foot is weak and flat, the shoe must be well seated out to prevent its pressing upon, and bruising, the sole; but, if the foot is strong, and the sole arched, there need not be more seating than will allow the point of a picker to pass freely around between the sole and the shoe, otherwise, the dirt and small stones will get in and bruise the sole, as much as the shoe would do, if it pressed upon it.

We should think that the weight of the shoe should vary in size with the kind of foot and the nature of the work. A weak foot should not wear a heavy shoe, nor, in fact, any shoe longer than a month. The shoe should not be heavier than the work requires. Horses used for heavy work, are shod with heavy shoes—thick toe, and quarter clips, high calks, and steel toes; and, in consequence of the great wear and tear, and strain, are shod about once in every three weeks; for the roadster, a narrow, light shoe is fitted to the crust; and the racer, a bare rim of iron, flat on the foot surface, and grooved on the ground.

Another fashion, imitates an old shoe worn off at the toe, which is certainly an advantage to roadsters; (see cut). These new shoes to their feet are like new shoes to our feet, if they were made to fit exactly like the old ones.

The French shoes have a convex ground surface, and the foot is fashioned to it by leaving the quarters full, and the crust sloped off towards the toe and heels.

Stonehenge states: "That, until recently, the whole process of making shoes was performed by hand; but now, in the United States, the greater bulk is made by machinery, and at one immense establishment.

"The manufactory of Messrs, Burden & Sons, at Troy, New York State, with its six forging machines, turns out six shoes per second; and, in four years, made twenty-five thousand tons; or, calculating one and a half pounds to the shoe, thirty-seven millions. These shoes are of the very best of iron, warranted to bend double cold, and wear as long as any made by hand; the iron used in their manufacture bearing a tensile strain of seventy-eight thousands pounds to the square inch.

"The power of the factory is gained by a large stream of water, with a head of seventy-two feet, acting on an over-shot wheel sixty feet in diameter, with buckets twenty-two feet long and six feet and four inches deep—the whole wheel weighing over three hundred tons. Connected with the establishment is a horse shoe museum, comprising many hundred specimens of shoes of all ages and all countries, collected together at much expense, with a view to improvement upon the old types. There are now three different patterns manufactured, and they will furnish any other pattern desired, if ordered in sufficient quantities."

The cost of the shoe to the blacksmith is about a cent and a half a pound above the price of the iron.

I propose, at this point, to note at length quotations of Murray from Lafosse, the great French veterinarian, the wisest man, in Mr. Murray's opinion, who ever wrote on the subject, and from whose works more ideas have been taken without any acknowledgment, by the writers of the last fifty years, on the horse's foot, than from any other author. He wrote in the first half of the eighteenth century, and when speaking of the errors then existing in horse-shoeing, he says:

1. "Long shoes, thick at the heels, never remain firmly attached to the feet in consequence of their weight, and break the clenches of the nails.

2. "They require proportionately large nails to retain them, and these split the horn; or, frequently, their thick stalks press against the sensitive laminæ and sole, and cause the horse to go lame.

3. "Horses are liable to pull off these long shoes when the hind foot treads upon the heel of the fore shoe, either in walking or while standing, by putting one on

the other, or between two paving stones in the pavement, between the bars of gates, in the drawbridges of fortifications, or in heavy ground.

4. "They move heavily, as the weight of their shoes fatigues them.

5. "Long shoes with massive heels raise the frogs from the ground and prevents the horse walking on those parts. Then, if the horse has a humor in the frog, it becomes a Frictbrush, or Crapand (Canker) because the humor lodges there. In shoeing with short shoes, the horse goes on his frog; the humor is dissipated more easily, particularly in the fore feet, as the animal places more weight upon them than the hind ones.

6. "Long shoes, thick at the heels, when put upon the feet which have low heels, bruise and bend them inwards, and lame the horse, although the heels be sprung; and when the foot is raised, we can see daylight between the shoe and the hoof. When it is on the ground, the heel descends to the shoes, because the hoof is flexible.

7. "Shoes long, and strong at the heels, when the foot is pared—the frog being removed a long distance from the ground—cause many accidents; such as the rupture or straining of the flexor tendon, and compression of the vascular sole—a circumstance not known until I pointed it out.

8. "Long shoes, cause horses to slip and fall, because they act like a patten on the slippery pavement as well in summer as in winter.

9. "Long shoes are also injurious where horses lie like a cow, in consequence of the heels wounding the elbows.

10. "Calkins should not be used on paved roads; they are only useful on ice or slippery ground.

11. "The calkins on the inside heels are liable to wound the coronet when the horse happens to cross his feet.

12. "A horse shod with them, is soon fatigued, and never goes easy.

13. "The horse which has only a calkin on the outside, does not stand fair; and the calkin confines the movement of the coronary articulation, the foot being twisted to one side.

14. "If a horse has his feet pared, and loses a shoe, he cannot travel without breaking and bruising the wall and damaging the horny sole, because the horn is too thin to protect it.

15. "If the shoes are long, and the heels of the hoof pared out hollow, stones and pebbles lodge between the shoe and the sole, and make the horse lame.

16. "Flat feet become convex by hollowing the shoes to relieve the heels and the frog, because the more the shoes are arched from the sole, the more the wall of the hoofs is squeezed and rolled inwards; particularly towards the inner quarter, which is the weakest. The sole of the foot becomes convexed, and the horse is nearly always unfit for service.

17. "If the wall of the hoof is thin, and the shoes are arched, the quarters are so pressed upon that the horse is lame.

18. "Pared hoofs are exposed to considerable injury from wounds by nails, stones, glass, etc.

19. "The pared sole readily picks up earth or sand, which forms a kind of cement between it and the shoe and produces lameness.

20. "The reason why it is dangerous to pare the feet of horses, is, because, when the sole is pared, and the horse stands in a dry place, the horn becomes dessicated by the air which enters it and removes its moisture and suppleness, and often causes the animal to be lame.

21. "A habit to be abolished, is that in which the farrier, to save trouble, burns the sole with a hot iron so as to pare it more easily. The result, often, is to heat the sensitive sole and cripple the horse.

22. "It often happens that, to make the foot pleasant to look at, the horn of the sole is removed to the quick; and the flesh springs out from it. This granulation is called a "cherry," and sometimes it makes the horse unserviceable for a considerable period.

23. "It is the pared foot which is most affected with what is termed contracted or weak inside quarter, and which also lames the horse.

24. "It also happens that one or both quarters contract, and sometimes even the whole hoof; then, in consequence of its smallness, all the internal parts are confined in their movements. This lames the horse, and is due to paring.

25. "There also occurs another accident. When the quarter becomes contracted, the hoof splits in its lateral aspect. This accident is termed a sand-crack—*seime*—and the horse is lame.

26. "The fashion of paring the hoofs, and especially the heels, within which are the bars, causes contraction; and this renders the horse lame.

27. "It is an abuse to rasp the hoofs of horses; this alters the hoof, and forms sand-cracks.

28. "If a horse which has pared hoofs, happens to

lose his shoes, and walks without them, the horn is quickly used, and the feet damaged.

29. "Another defect is in the manner of making large nail holes in the shoes, etc.

30. "The majority of farriers, in order to pare the sole well, cut it until it bleeds; and to stop the hemorrhage, they burn the place with a hot iron, and the horse returns lame to the stable."

Lafosse goes on to say:

"To prevent horses slipping on the dry, glistening pavement, it is necessary to shoe them with a crescent-shaped shoe, that is, a shoe which only occupies the circumference of the toe, and whose heels gradually thin away to the middle of the quarters, so that the frog and heels bear on the ground, and the weight to be sustained behind and before; but particularly in the latter, because the weight of the body falls heaviest there.

"The shorter the shoe, the less the horse slips; and the frog has the same influence in preventing this, that an old hat placed under our own shoes, would have in protecting us from slipping on the ice."

Lafosse would, however, shoe a weak-walled foot a little longer, (and horses which have thin, convex soles) but fits the shoe so that it will not press upon the sole and allow the heels and frog to rest upon the ground. This is the only true method of preserving the foot and restoring it.

The crescent shoes are used for a horse which has weak, incurvated quarters, as they not only relieve them, but also restore them to their natural condition; also for horses which have contusions at the heels—(*bleins*) corns, and for cracks (*seimes*).

Lafosse further says:

"These short shoes, thin at the heels, have caused the horses to walk on their frogs, which are their points of support; and those which were lame at the heels, to become sound again; those, also, whose inside quarters were contracted, bent over, and split (sand-crack,) have been cured.

"It has been the same with horses whose quarters and heels have been contracted: these have been widened, and have assumed a proper shape. The same may be said of those whose soles were convex, and which went lame, with long shoes. My method has also preserved those horses which had a tendency to thrush, and canker of the frog.

"If the horse be shod with calkins, there is a great space between the frog and the ground; the weight of the body comes on the calkins; the frog, which is in the air, cedes to the weight; the tendon is elongated; and, if the horse makes a violent and sudden movement, the rupture of that organ is almost inevitable, because the frog cannot reach the ground to support it in the very place it ought to; and if the tendon does not break, the horse is lame for a long time from the great extension of the fibres, some of which may have been ruptured. If the horse be shod without heels to his shoes, the frog, which carries all the weight of the horse's body, yields at each step, and returns again to its original form.

"This tendon is never in a state of contraction: its fibres are no longer susceptible of violent distension during a sudden movement. I will go so far as to assert, that rupture of the tendon will never occur on a flat pavement: if it does, it will be in the space between two paving stones.

"Two things clearly follow from what I have said —that it may happen that the tendon Achilles, sustains all the different degrees of violence that can be imagined, from total rupture to the smallest abrasion of its fibres, which will cause the horse to go lame; and it is on the frog alone, that all these different degrees depend, as has been demonstrated, more particularly in the fracture of the navicular bone and the anatomy of the foot. My new shoeing, I repeat, has nothing to oppose it but prejudice. *Anatomy*, which has made known to me the structure of the foot, has demonstrated all of its advantages, and experience has fully confirmed them."

Fleming, quoting the foregoing, in conclusion, says:

"I regret extremely that our limits forbids my translating at greater length from this splendid monograph; but I hope I have been able, to some extent, to show that Lafosse's ideas on shoeing were founded on sound anatomical and physiological principles, the result of close observation and experience. And yet, they appear to have made but little progress in the face of the opposition offered by ignorant grooms and farriers, who were incompetent to understand anything but the mere every-day routine of the rapidly degenerating art; and the prejudice of those amateur horsemen, who, though the last, perhaps, to take upon trust, statements relative to other matters, would yet believe everything told them by these horse attendants and shoers. The farriers of Paris, indeed, unanimously protested against the innovation, two years after Lafosse had published his treatise, and their protest seems to have carried the mind of the crowd."

W. Osmer wrote a treatise on the diseases and

lameness of horses, (London, 1776), and as he is considered good authority, as well as Fleming and Lafosse, I will also quote freely from him.

After warning farriers not to remove anything more of the crust, or wall of the hoof, than is absolutely necessary, he says:

"In all broad fleshy feet, the crust is thin, and, should therefore, suffer the least possible loss. On such feet, the rasp alone is generally sufficient to make the bottom plain, and produce a sound foundation, *without the use of the desperate butress.*

"The superfices of the foot around the outside, now made plain and smooth, the shoe is to be made quite flat, of an equal thickness all round the outside, and open, and most narrow backwards at the extremities of the heels, for the generality of horses. Those, whose frogs are diseased, either from natural or incidental causes require the shoe to be wider backwards, and to prevent this flat shoe from pressing on the sole of the horse, the outer part thereof is to be made thickest, and the inside gradually thinner. In such a shoe, the frog is admitted to touch the ground, the necessity of which has already been shown; add to this the horse stands more firmly on the ground, having the same points of support, as in a natural state.

"Here now, is a plain, easy method, agreeable to common-sense, and reason, conformable to the anatomical structure of the parts, and therefore to the design of Nature, a method so plain, that one would think nobody could swerve from it, or commit any mistake in the art where nothing is required but to make smooth the surface of the foot, to know what loss of crust each kind of foot will bear with advantage to itself, and to nail there-

on a piece of iron adapted to the natural tread of the horse. The design, good, or the use of the iron being only to defend the crust from breaking, the sole wanting no defense, if never pared.

"The modern artist uses little difference in the treatment of any kind of a foot, but with a strong arm and a sharp weapon, carries all before him, and will take more from a weak-footed horse at one paring, than Nature can furnish again in some months, whereby such are rendered lame. If a strong-footed horse with narrow and contracted heels, be brought before him, such meets with treatment yet more severe. The bar is scooped out, the frog is trimmed, and the sole drawn as thin as possible, even to the quick, under pretense of giving him ease, because, he says he is hot-footed, or foundered; by which treatment the horse is rendered more lame than he was before."

Fleming, in quoting Osmer, says:

"This causes contraction of the hoof and compression of the parts within; and, besides, a shoe was applied thin on the outer circumference and thick on the inner, which, being concave to the foot and convex to the ground, afforded but few points of support, removed the frog from pressure, and caused great mischief. I possess some specimens of this terrible instrument of last-century barbarism. It almost makes one shudder to think of the fearful agony the poor horses must have suffered when compelled to wear and work with it."

Osmer concludes: "Let the shoe on every horse stand wider at the point of the heels than the foot itself; otherwise as the foot grows in length, the heel of the shoe in a short time, gets within the heel of the

horse, which pressure often breaks the crust, and produces a temporary lameness, perhaps a corn.

"Let every kind of foot be kept as short at the toe as possible (so as not to affect the quick); for, by a long toe, the foot becomes thin and weak, the heels low, and the flexor tendons of the leg are strained. The shortness of the toe, helps, also, to widen the narrow heels. In all thin, weak-footed horses, the rasp should be laid on the toe in such a manner as to render it as thick as it may be, by which means the whole foot becomes gradually thicker, higher, and stronger.

"In all feet whose texture is very strong, the rasp may be laid obliquely on the fore part of the foot towards the toe, and the toe itself thinned, whereby the compression on the parts is rendered somewhat less by diminishing the strength of the hoof or crust.

"But this rasp is to be used with discretion, lest the crust, being too thin, and not able to support the weight of the horse, sand-crack may ensue; which frequently happens from too free or unskilled use of this tool, and from the natural rigid texture of the coronet. The heel of the shoe, on all strong and narrow-heeled horses, should be made straight at the extreme points; the form of the shoe, in some measure, helping to distend the heel of the horses. For the same reason, the shoe on the horse should be extended no farther than the point of the heel. It has already been said, that neither the frog nor sole should ever be pared; nevertheless, it must be understood, that it is impossible to pare the crust without taking away some of the adjacent sole; and it is also requisite in order to obtain a smooth and even surface, so far as the breadth of the shoe reaches, and no farther. The frog, also, will be-

come ragged; and loose pieces will occasionally separate from the body thereof, perhaps in one foot, and not in the other. When this happens, it should be cut away with the knife to prevent the gravel lodging therein; but if it be left to the artist to do, he will be sure to take away more of it at one time than will grow again in many weeks."

I have made these quotations, taken from the works of the wisest teachers—so considered—the world has ever had; and with the accumulated testimony of these great men, and for want of more space in this little book, will leave the subject with you.